

## ENGINEERING AND DESIGN

Automation-Aided Classroom Design Criteria:

a. Problem: Existing criteria does not adequately address the need for automated classroom facilities.

(1) AR 405-70, Utilization of Real Property, 15 September 1993, indicates classroom and training room criteria in Appendix D, Table D-4. The table allows a net area of  $1.4 \text{ m}^2$  ( $15 \text{ ft}^2$ ) per student for a chair with side arm, and  $2.8 \text{ m}^2$  ( $30 \text{ ft}^2$ ) for a 610 mm x 910 mm (2 ft x 3 ft) desk with chair. These requirements do not include any support spaces.

(2) DG 1110-3-106, Design Guide for U.S. Army Service Schools, March 1991, expands on the above criteria in its Chapter 4. Paragraph 4-2 D. states the following:

"Classroom space should be sized to support a variety of classes, instruction methods, and classroom activities. A lower limit of 25 square feet ( $2.3 \text{ m}^2$ ) applies to classrooms which just require chairs that do not have note-taking arms. An upper limit of 35 square feet ( $3.3 \text{ m}^2$ ) applies when there is a continuous need for audio-visual (A-V) presentations, writing surfaces, and the use of reference materials."

(3) Current training technology requires students to use a computer at a desk that also has space for reference materials, a flat work surface, and circulation space to support an instructor observing or assisting. Desk area is approximately 610 mm x 1520 mm (2 ft x 5 ft) and the minimum circulation behind the desk results in a workstation of  $4.6 \text{ m}^2$  ( $50 \text{ ft}^2$ ). When classroom circulation, and technical support areas for the classroom are added this results in a planning factor of  $7.0 \text{ m}^2$  ( $75 \text{ ft}^2$ ) of net area per student for the classroom area.

b. Probable Solution: USACE will develop a standard design to support automated classroom training utilizing data from the first new construction classrooms to be built at Fort Leonard Wood, MO. Until the standard design is developed automated classroom facilities will be developed based on the following criteria:

(1) Category Code 171-36. Automation-Aided Instruction Building.

(2) Sizing. Plan automated classrooms using 7.0 m<sup>2</sup> per student. Administrative support areas will be developed using the administrative space planning criteria of AR 405-70. Factors for net to gross area conversion are 1.25 for the administrative part of the building, and 1.45 for the classroom parts of the building and primary circulation.

(3) Architectural Criteria. Classrooms will be provided with carpeted raised computer flooring for flexibility of arrangement of automation support. Provide heating, ventilation, air conditioning, and non-glare lighting with lighting level adjustment. Provide audio-visual support and acoustically treated, tackable wall surfaces. DG 1110-3-106 provides additional information on sight lines, ceiling heights, and technical support requirements.

(4) Cost Engineering. For a midpoint of construction of October 1997, the authorized gross area cost is \$1,465.00/m<sup>2</sup> (\$136.10/ft<sup>2</sup>) for area cost factor of 1.00.

c. Implementation: The implementation of this new policy is considered to have ***routine application*** as defined by ER 1110-345-100.